

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-12. Canceled.

13. (New) A remote controller for controlling an electric toy vehicle that includes an electric motor and a digital receiver, the electric toy vehicle being designed to run on a track that includes a groove to guide movement of the toy vehicle and electrically conductive traces that supply electrical power and control signals to the toy vehicle, the remote controller comprising:

at least one user actuable element that generates an input signal;

a processor that receives the input signal from the at least one user actuable element and that generates a digital vehicle control signal having a digital waveform that includes (1) an address portion identifying a specific toy vehicle and (2) a vehicle operation control portion that contains a command to instruct a toy vehicle to take a particular action; and

a transmitter that couples the digital vehicle control signal to the electrically conductive traces of a track.

14. (New) The remote controller of claim 13, wherein the at least one user actuable element comprises a vehicle speed control element that produces a speed input signal.

15. (New) The remote controller of claim 14, wherein the vehicle speed control element comprises an optical reader.

16. (New) The remote controller of claim 13, wherein the at least one user actuable element comprises a light switch that produces a light control input signal.

17. (New) The remote controller of claim 13, wherein the at least one user actuable element comprises a steering input device that produces a steering input signal.

18. (New) The remote controller of claim 13, further comprising a vehicle selection switch that allows a user to select which of multiple toy vehicles the remote controller will control and that outputs a vehicle selection signal, wherein the processor receives the vehicle selection signal, and wherein the processor generates digital vehicle control signals that include different values in the address portion depending on the vehicle selection signal received from the vehicle selection switch.

19. (New) A toy vehicle system, comprising:

a toy vehicle track that includes at least one guide groove to guide movement of a toy vehicle and electrically conductive traces that carry a DC vehicle drive voltage;

the remote controller of claim 13, wherein the remote controller is coupled to at least one of the electrically conductive traces of the track so that the digital vehicle control signals generated by the remote controller are transmitted over the at least one electrically conductive trace; and

a toy vehicle that includes:

a guide member that extends down into the guide groove of the track when the vehicle is mounted on the track to guide the vehicle along the track;

electrical pickups that contact the electrically conductive traces on the track;

an electrical motor that drives the toy vehicle along the track; and

a vehicle controller coupled to the electrical pickups and the electrical motor, wherein the vehicle controller receives digital vehicle control signals that are transmitted from the remote controller through the at least one electrically conductive trace on the track, wherein the vehicle controller compares an authentication code stored in the address portion of the digital vehicle control signals to a predetermined value, and wherein the vehicle controller acts on the commands contained in the vehicle operation control portion of a digital vehicle control signal when the authentication code

stored in the address portion of the digital vehicle control signal matches the predetermined value.

20. (New) The toy vehicle system of claim 19, wherein the vehicle controller selectively applies all or just a portion of the DC vehicle drive voltage received from the electrically conductive traces on the track to the electrical motor in response to digital vehicle control signals received from the remote controller.

21. (New) The toy vehicle system of claim 19, wherein the digital vehicle control signals are superimposed onto the DC vehicle drive voltage.

22. (New) The toy vehicle system of claim 19, wherein the digital vehicle control signals are time division multiplexed with the DC vehicle drive voltage.

23. (New) The toy vehicle system of claim 19, wherein the electrically conductive traces comprise first and second electrically conductive traces that carry the DC vehicle drive voltage, and a third electrically conductive trace that carries the digital vehicle control signals.

24. (New) The toy vehicle system of claim 19, wherein the toy vehicle includes a direction changing element that is switchable between a first position and a

second position, wherein the vehicle controller controls the position of the direction changing element based on digital vehicle control signals received from the remote controller.

25. (New) The toy vehicle system of claim 24, wherein the direction changing element is biased into the first position, and wherein the controller moves the direction changing element into the second position in response to digital vehicle control signals received from the remote controller.

26. (New) The toy vehicle system of claim 25, wherein the direction changing element interacts with a direction changing groove of the track, and wherein the track includes direction changing grooves at locations where the guide groove on the track branches.

27. (New) The toy vehicle system of claim 19, wherein the toy vehicle further comprises:

a vehicle information generator that generates digital vehicle information signals having a digital waveform that include (1) an address portion that bears an authentication code that identifies the toy vehicle and (2) a vehicle information portion that includes information about the toy vehicle; and

a transmitter that couples the digital vehicle information signals to at least one of the electrically conductive traces of the track.

28. (New) The toy vehicle system of claim 27, wherein the remote controller further comprises a receiver that receives the digital vehicle information signals from the at least one electrically conductive trace of the track, and wherein the remote controller includes a display device that displays information about a vehicle using the information encoded in the received digital vehicle information signals.

29. (New) The toy vehicle system of claim 28, wherein the remote controller includes a vehicle selection switch that allows a user to select which of multiple toy vehicles the remote controller will control, wherein the receiver of the remote controller receives a signal from the vehicle selection switch indicative of the selected vehicle, wherein the receiver compares the authentication code in each digital vehicle information signal to a particular predetermined value that is dependent on the signal received from the vehicle selection switch, and wherein the remote controller only displays information about a vehicle if the authentication code in the digital vehicle information signal matches the particular predetermined value.

30. (New) The toy vehicle system of claim 27, wherein the toy vehicle further comprises a vehicle information pickup module that interacts with the track to determine

information about the vehicle, and wherein the vehicle information determined by the vehicle information pickup module is encoded in the vehicle information portion of the digital vehicle information signals.

31. (New) The toy vehicle system of claim 30, wherein the vehicle information determined by the vehicle information pickup module comprises the position of the vehicle along the track.

32. (New) The toy vehicle system of claim 31, wherein the vehicle information pickup module comprises means for sensing at least one marker on the track.

33. (New) The toy vehicle system of claim 31, wherein the vehicle information pickup module comprises means for sensing a plurality of different markers on the track.

34. (New) The toy vehicle system of claim 19, further comprising a recording section that records the digital vehicle control signals generated by the remote controller.

35. (New) The toy vehicle system of claim 27, further comprising a recording section that records the digital vehicle control signals generated by the remote controller and the digital vehicle information signals generated by the toy vehicle.

36. (New) A method of controlling a toy vehicle that includes an electric motor and a digital receiver, the electric toy vehicle being designed to run on a track that includes a groove to guide movement of the toy vehicle and electrically conductive traces that supply electrical power and control signals to the toy vehicle, the method comprising:

generating a digital vehicle control signal having a digital waveform that includes (1) an address portion that includes an authentication code that identifies a specific toy vehicle and (2) a vehicle operation control portion that contains a command to instruct a toy vehicle to take a particular action;

transmitting the digital vehicle control signal over at least one electrically conductive trace of a toy vehicle track;

receiving, at the toy vehicle, the digital vehicle control signal, the toy vehicle receiving the digital vehicle control signal via an electrical pickup that contacts the at least one electrically conductive trace on the track;

comparing the authentication code in the address portion of the digital vehicle control signal to a predetermined value; and

controlling an operation of the toy vehicle based on the command in the control portion of the digital vehicle control signal if the authentication code matches the predetermined value.

37. (New) The method of claim 36, wherein the transmitting step comprises superimposing the digital vehicle control signal onto a DC vehicle drive voltage carried on the electrically conductive traces of the track.

38. (New) The method of claim 36, wherein the transmitting step comprises time division multiplexing the digital vehicle control signal with a DC vehicle drive voltage carried on the electrically conductive traces of the track.

39. (New) The method of claim 36, further comprising:
generating a digital vehicle information signal having a digital waveform that includes (1) an address portion that bears an authentication code that identifies the toy vehicle and (2) a vehicle information portion that includes information about the toy vehicle; and

transmitting the digital vehicle information signal over at least one of the electrically conductive traces of the track.

40. (New) The method of claim 39, further comprising:
receiving the digital vehicle information signal with a remote controller coupled to the electrically conductive traces of the track;
comparing the authentication code in the digital vehicle information signal to a predetermined value; and

displaying information about a vehicle encoded in the digital vehicle information signal on the remote controller if the authentication code matches the predetermined value.